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COMPANY

ENVIRONMENTAL RESTORATION
RFCA STANDARD OPERATING PROTOCOL
FOR ROUTINE SOIL REMEDIATION
FY03 NOTIFICATION #03-05
IHSS GROUP 900-1

February 2003

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ACRONYMS

AL	action level
ALARA	as low as reasonably achievable
D&D	Decontamination and Decommissioning
DOE	Department of Energy
ER	Environmental Restoration
ER RSOP	Environmental Restoration RFCA Standard Operating Protocol
FY	Fiscal Year
IA	Industrial Area
IASAP	Industrial Area Sampling and Analysis Plan
IHSS	Individual Hazardous Substance Site
PAC	Potential Area of Concern
PCB	Polychlorinated Biphenyls
PCOC	potential contaminant of concern
POC	Point of Compliance
POE	Point of Evaluation
RCRA	Resource Conservation and Recovery Act
RFCA	Rocky Flats Cleanup Agreement
RFETS	Rocky Flats Environmental Technology Site
RISS	Remediation and Industrial Site Services
RSOP	RFCA Standard Operating Protocol
SRS	Soil Risk Screen
SVOC	semi-volatile organic compound
UBC	Under Building Contamination
VOC	volatile organic compound

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1.0 INTRODUCTION

This Environmental Restoration (ER) Rocky Flats Cleanup Agreement (RFCA) Standard Operating Protocol (RSOP) for Routine Soil Remediation (ER RSOP) (DOE 2002a) Fiscal Year (FY) 03 Notification includes the notification to remediate Individual Hazardous Substance Sites (IHSSs), Potential Areas of Concern (PACs), and Under Building Contamination (UBC) Sites at the Rocky Flats Environmental Technology Site (RFETS) Industrial Area (IA) during FY03. The purpose of this Notification is to invoke the ER RSOP for IHSS Group 900-1. Activities specified in the ER RSOP are not reiterated here; however, deviations from the ER RSOP are included where appropriate.

Soil with contaminant concentrations greater than the proposed RFCA Action Levels (ALs), or as indicated by the Soil Risk Screen (SRS), and associated debris will be removed in accordance with RFCA and the ER RSOP (DOE, CDPHE, EPA 2002). If remediation starts prior to the approval of the new ALs, remediation will be conducted using the current Tier I and Tier II ALs (DOE, CDPHE, EPA 1996), and a contact record will be submitted to the regulatory agencies documenting the use of the current ALs.

The IHSS Group is shown on Figure 1, and the proposed remediation sites covered under ER RSOP Notification #03-05 are listed in Table 1.

Table 1
Potential Remediation Areas for IHSS Group 900-1

IHSS Group	IHSS/PAC/UBC Site	PCOCs	Media	Estimated Remediation Volume
900-1	UBC 991, Weapons Assembly and R&D	Uranium Plutonium Metals VOCs	Soil Beneath and Around Foundation and Drain Lines; Sediment in Drain	> 1 cy
	IHSS 900-173, Radioactive Site Building 991	Uranium Plutonium Metals VOCs	Soil Beneath Asphalt	> 1 cy
	IHSS 900-184, Radioactive Site 991 Steam Cleaning Area	Uranium Plutonium Metals VOCs	Soil Beneath Asphalt and Drain Lines; Sediment in Drain	> 1 cy
	PAC 900-1301, Building 991 Enclosed Area	Uranium Plutonium Metals VOCs	Soil Beneath Asphalt, Concrete Tank Containment, and Drain Lines; Sediment in Culvert	> 1 cy
	PAC 900-1307, Explosive Bonding Pit	Uranium Metals Explosives	Soil Beneath and Around Building Slab And Pit	< 1 cy

R&D – research and development
VOC – volatile organic compound

2.0 IHSS GROUP 900-1

IHSS Group 900-1 includes UBC 991, Weapons Assembly and Research and Development; IHSS 900-173, Radioactive Site Building 991; IHSS 900-184, Radioactive Site 991Steam Cleaning Area; PAC 900-1301, Building 991 Enclosed Area; and PAC 900-1307, Explosive Bonding Pit. The IHSS, PAC and UBC sites are shown on Figure 2.

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2.1 Potential Contaminants of Concern

Potential contaminants of concern (PCOCs) at IHSS Group 900-1 are listed in Table 1 and were determined based on process knowledge and data collected during previous studies (DOE 1992-2001, DOE 2001, DOE 2000).

2.2 Project Conditions

The following conditions are present at this site:

- UBC 991 consists of various structures (refer to Figure 2). The Building 991 basements are located below grade, as are Corridors A, B and C (tunnels), and Buildings (Vaults) 996, 997, 998 and 999.
- Buildings 991, 992, 984 and 989 are located in a land depression, as are the two transformers located to the east of Building 991. Building 985, the Filter Plenum Building, is located on the hillside north of Building 991.
- There is a below-grade drain outside the basement doors on the east side of Building 991.
- PAC 900-1301 is located south of Building 991 and is no longer enclosed.
- IHSS 900-173 and IHSS 900-184 are drained by a storm drain that flows to the south. This drain also receives flow from at least one of the Building 991 roof drains.
- The area south of Building 991 is drained by a concrete drainage ditch, which flows to the southeast. At least one of the Building 991 roof drains discharges to the ditch.
- Building 993 (within PAC 900-1307) has been demolished. All that remains are the concrete slab and pit.
- Buildings 980 and 968 are no longer present and were located on top of the hill to the north of Building 991. The Building 980 slab contains a large concrete rubble pile.
- IHSS 900-175 makes up IHSS Group 900-4 and is not part of this notification.
- PAC 900-1306, associated with the PCB transformers to the east of Building 991, is not part of this notification. This PAC was previously remediated and proposed for no further action in the Annual Update for the Historical Release Report (DOE 1996).
- PAC 900-1308 makes up IHSS Group 900–5 and is not part of this notification. This site has been approved for no further action.

2.3 RFCA Soil Risk Screen Evaluation

The SRS is performed when non-radionuclides and uranium are present in the soil between 6 inches and 3 feet below ground surface, and when americium and plutonium are present between 3 feet and 6 feet below ground surface. Current site conditions are evaluated to determine if remediation is required by the SRS. Some aspects of the SRS cannot be evaluated now, but will be evaluated after characterization.

2.3.1 Action Level Comparison

Current data indicate all contaminant concentrations are less than proposed RFCA ALs (DOE et al 2002), however only limited characterization data are available (DOE 2003). The AL comparison will be reevaluated after characterization.

2.3.2 Potential Erosion Areas

The southeastern portion of this IHSS Group is considered an area subject to erosion and landslides in accordance with Figure 1 of the RFCA Modification (DOE et al 2002).

2.3.3 Groundwater Treatment

Current groundwater treatment systems do not collect groundwater from beneath this IHSS Group. However potential groundwater contamination will be addressed through the IA Plume remedy.

2.3.4 Ecological Receptors

Current data indicate all contaminant concentrations are less than RFCA ecological ALs, however only limited characterization data are available (DOE 2003). The AL comparison will be reevaluated after characterization.

2.3.5 Surface Water

Surface water may be impacted by IHSS Group 900-1. However GS 10, the closest downstream POE receives water from a large part of the IA. Please see additional information in Section 2.5.2.

2.4 Remediation Plan

This RSOP Notification remediation plan for IHSS Group 900-1 includes the following objectives:

- Grout or remove any remaining sections of Building 991 and Building 992 drains, remove any remaining building structures (e.g., slabs and foundations) within 3 feet of current grade, if not removed by Remediation and Industrial Site Services (RISS) Decontamination and Decommissioning (D&D) staff, and recycle in accordance with the RSOP for Recycling Concrete (DOE 1999);

- Remove the Building 993 slab and pit, and dispose as low level waste;

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- Remove any other remaining Building 993 utilities and components within 3 feet of current grade;

- Remove soil with non-radionuclide or uranium contaminant concentrations greater than RFCA WRW ALs to a depth of 6 inches. If uranium is present at 6 inches, remove one additional equivalent interval of soil for ALARA.

- Remove soil with plutonium or americium activities greater than RFCA WRW ALs to a depth of 3 feet or to less than 50 pCi/g, which ever comes first. If plutonium or americium activities are greater than RFCA WRW ALs at 3 feet below the surface, remove one equivalent interval for ALARA. If concentrations are still above ALs at 6 feet, conduct a SRS.

- Remove soil with contaminant concentrations less than RFCA WRW ALs if indicated through the stewardship and ALARA evaluations and the consultative process (Section 2.4);

- Consult with regulatory agencies if contaminant concentrations are greater the ecological ALs:

- Collect confirmation samples in accordance with the Industrial Area Sampling and Analysis Plan (IASAP) (DOE 2001a).

It is assumed that the tunnels and vaults will meet free-release criteria and will remain. However, if free-release criteria are not met, the D&D Program will implement necessary actions. It is also anticipated that after remediation there will be areas at this site with concentrations of metals, radionuclides, and organics greater than background plus two standard deviations or method detection limits, but below RFCA ALs.

2.5 Stewardship Evaluation

Based on the PCOCs (Table 1 and Section 2.1) and the ER RSOP (DOE 2002a), it is anticipated that all contamination above RFCA ALs will be remediated. Figure 2 shows the potential remediation area.

Because the full extent of excavation and remediation is not known at this time, an additional stewardship evaluation will be conducted during remediation using the consultative process. A new map of residual contamination will be generated after remediation. The following sections present the stewardship evaluation.

2.5.1 Proximity to Other Contaminant Sources

IHSS Group 900-1 is in the RFETS IA. Part of UBC 991 (i.e., the 991 Tunnel and Building 999, and the eastern edge of Building 991) is located near other potential contaminant sources. IHSS 900-175 is located above 991Tunnel, and PAC 900-1306 is located approximately 20 feet east of Building 991 (Figure 2). In addition, the PCOCs associated with PAC 900-1306 (i.e., PCBs) are very different than those associated with IHSS Group 900-1. IHSS Group 900-1 is not located near any other potential contaminant sources.

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2.5.2 Surface Water Protection

Surface water protection includes the following considerations:

Is there a pathway to surface water from potential erosion to streams or drainages?

There are potential pathways to surface water from the areas around Building 991 and Building 993. There is a storm drain that drains IHSS 900-173 and IHSS 900-184 to the south. There is also a concrete drainage ditch (culvert) that drains the area south of Building 991, including PAC 900-1301. Runoff from PAC 900-1307 enters South Walnut Creek.

Do characterization data indicate there are contaminants in surface soil?

Existing surface soil data for IHSS Group 900-1 indicate all soil contaminant concentrations are below the RFCA Tier II ALs. Additional sampling within the IHSS Group will provide additional data on contaminants in surface soil.

Do monitoring results from Points of Evaluation (POEs) or Points of Compliance (POCs) indicate there are surface water impacts from the area under consideration?

Plutonium and americium concentrations have exceeded surface water quality standards at GS10, a POE, during springtime. However, GS10 is located approximately 1,250 feet downstream from IHSS Group 900-1 and is used to monitor water leaving the IA. While IHSS Group 900-1 could contribute some of the detected contaminants at GS10, it is difficult to distinguish individual sources. Evaluations of potential sources have been conducted and will continue to be conducted under the Integrated Monitoring Program. Results from characterization of IHSS Group 900-1 may be used as part of the on-going source evaluation (DOE 2003). In addition, areas adjacent to IHSS Group 900-1 will be further characterized in the future, and results may be used in source evaluation.

Is the IHSS Group in an area with high erosion potential, based on the 100-Year Average Erosion Map?

The southeastern portion of IHSS Group 900-1 is in an area of potential erosion (Figure 1 of the RFCA modification; DOE, CDPHE, EPA 2002).

2.5.3 Monitoring

Monitoring includes the following considerations:

Do monitoring results from POEs or POCs indicate there are groundwater impacts from the area under consideration?

The nearest downgradient wells to IHSS Group 900-1 are wells 2187 and 2287. Acetone, PCE, several metals, and several radionuclides were detected at concentrations exceeding background in these wells. According to the OU 8 Phase I RFI/RI Work Plan, the levels of radionuclides detected in groundwater samples from these wells may be attributable, in part, to releases in this IHSS Group (DOE 1994). However, it should be noted that groundwater in the area of this IHSS is downgradient of a significant portion of the IA and that wells 2187 and 2287 were abandoned and have not been sampled since 1995.

Can the impact be traced to a specific IHSS Group?

Impacts can not be traced to IHSS Group 900-1, however, IHSS Group 900-1 could be a source of contamination.

Are additional monitoring stations needed?

Not applicable at this time. The need for and placement of monitoring stations will be re-evaluated in the *Long-Term Stewardship Plan.*

Can existing monitoring locations be deleted if additional remediation is conducted?

Not applicable. Existing wells monitor contamination from areas outside IHSS Group 900-1.

2.5.4 Stewardship Actions and Recommendations

The current stewardship actions and recommendations for IHSS Group 900-1 are as follows:

- Use Best Management Practices to reduce erosion into surface water drainage.
- Implement near-term institutional controls until final closure and stewardship decisions are implemented, including the following:
  - Fencing and signs to restrict access; and
  - Soil excavations controlled through the Site Soil Disturbance Permit process.
- Implement long-term stewardship actions, including the following:
  - Prohibitions on construction of buildings in the IA;
  - Restrictions on excavations or other soil disturbance; and
  - Prohibitions on groundwater pumping in the area of IHSS Group 900-1.

These recommendations may change based on in-process remediation activities and other future RFETS remediation decisions.

2.6 Accelerated Action Remediation Goals

ER RSOP remedial action objectives include the following:

1. Provide a remedy consistent with the RFETS goal of protection of human health and the environment;
2. Provide a remedy that minimizes the need for long-term maintenance and institutional or engineering controls; and
3. Minimize the spread of contaminants during implementation of accelerated actions.

The accelerated action remediation goals for IHSS Group 900-1 include the following:

- Remove any remaining Building 991 and Building 992 slab and foundation material within 3 feet of grade, if not removed by RISS D&D, and recycle in accordance with the RSOP for Recycling Concrete (DOE 1999), or dispose at an appropriate facility, pending waste characterization;

- Disrupt pathway to surface water by plugging ends and/or removing sections of building (991 and 992) drains;

- Remove any other remaining building (991 and 992) utilities and components within 3 feet of current grade;

- Remove the Building 993 slab and pit, and dispose as low level waste;

- Remove any other remaining Building 993 utilities and components within three feet of current grade; and

- Remove soil with non-radionuclide or uranium contaminant concentrations greater than RFCA WRW ALs to a depth of 6 inches. If uranium is present at 6 inches, remove one additional equivalent interval of soil for ALARA.

- Remove soil with plutonium or americium activities greater than RFCA WRW ALs to a depth of 3 feet or to less than 50 pCi/g, which ever comes first. If plutonium or americium activities are greater than RFCA WRW ALs at 3 feet below the surface, remove one equivalent interval for ALARA. If concentrations are still above ALs at 6 feet, conduct a SRS.

- Remove soil with contaminant concentrations less than RFCA WRW ALs if indicated through the stewardship and ALARA evaluations and the consultative process (Section 2.4).

- Consult with regulatory agencies if contaminant concentrations are greater the ecological ALs.

2.7 Treatment

Not applicable.

2.8 Project-Specific Monitoring

High-volume air samplers may be used at the remediation area consistent with work controls to determine airborne radioactivity concentrations. Approximate locations of air samplers are shown on Figure 2.

2.9 Resource Conservation and Recovery Act (RCRA) Units and Intended Waste Disposition

Buildings 991, 996 and 998 are currently being used to store RCRA-regulated wastes. Some areas are listed on the Master List of RCRA Units as Permitted Areas (e.g., Unit

991.1). RCRA-regulated areas will be closed in accordance with Colorado Hazardous Waste Act (CHWA) requirements prior to building demolition.

Building 993 was listed on the Master List of RCRA Units as a Permitted Area. The area was closed in accordance with CHWA closure requirements prior to building demolition in accordance with the Facility Disposition RSOP (DOE 2002b).

2.10 Administrative Record Documents

DOE, 1992-2001, Historical Release Reports for the Rocky Flats Plant.

DOE, 1996, Annual Update, Historical Release Report, Rocky Flats Environmental Technology Site, September.

DOE, 1999, RFCA Standard Operating Protocol for Recycling Concrete, Rocky Flats Environmental Technology Site, September.

DOE, 2000, Industrial Area Data Summary Report, Rocky Flats Environmental Technology Site, September.

DOE, 2001, Industrial Area Sampling and Analysis Plan, Rocky Flats Environmental Technology Site, June.

DOE, 2002a, Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation, Rocky Flats Environmental Technology Site, January.

DOE, 2002b, RFCA Standard Operating Protocol for Facility Disposition Notice for Building 993, Rocky Flats Environmental Technology Site, October.

DOE 2003, Industrial Area Sampling and Analysis Plan FY03 Addendum #IA-03-03, Rocky Flats Environmental Technology Site, January.

DOE, CDPHE, EPA, 1996, Final Rocky Flats Cleanup Agreement, U.S. Department of Energy, Colorado Department of Public Health and Environment, and U.S. Environmental Protection Agency, July.

DOE, CDPHE, EPA, 2002, Proposed RFAC Modifications, U.S. Department of Energy, Colorado Department of Public Health and Environment, and U.S. Environmental Protection Agency, November.

2.11 Projected Schedule

Remediation of IHSS Group 900-1 is expected to begin in January of FY03.

3.0 PUBLIC PARTICIPATION

ER RSOP Notification #03-05 activities were discussed at the January 2003 ER/D&D Status meeting. A PDF version of this notification was provided to the local governments. This notification is available at the Rocky Flats Reading Rooms and on the EDDIE website at www.rfets.gov.

4.0 REFERENCES

DOE, 1992-2001, Historical Release Reports for the Rocky Flats Plant, Golden, Colorado.

DOE, 1996, Annual Update, Historical Release Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 1999, RFCA Standard Operating Protocol for Recycling Concrete, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2000, Industrial Area Data Summary Report, Rocky Flats Environmental Technology Site, Golden, Colorado, September.

DOE, 2001, Industrial Area Sampling and Analysis Plan, Rocky Flats Environmental Technology Site, Golden, Colorado, June.

DOE, 2002a, Environmental Restoration RFCA Standard Operating Protocol for Routine Soil Remediation, Rocky Flats Environmental Technology Site, Golden, Colorado, January.

DOE, 2002b, RFCA Standard Operating Protocol for Facility Disposition Notice for Building 993, Rocky Flats Environmental Technology Site, Golden, Colorado, October.

DOE, 2003, Industrial Area Sampling and Analysis Plan FY03 Addendum #IA-03-03, Rocky Flats Environmental Technology Site, Golden, Colorado, January.

DOE, CDPHE, EPA, 1996, Final Rocky Flats Cleanup Agreement, U.S. Department of Energy, Colorado Department of Public Health and Environment, and U.S. Environmental Protection Agency, Rocky Flats Environmental Technology Site, July.

DOE, CDPHE, EPA, 2002, Proposed RFCA Modifications, U.S. Department of Energy, Colorado Department of Public Health and Environment, and U.S. Environmental Protection Agency, Rocky Flats Environmental Technology Site, November.

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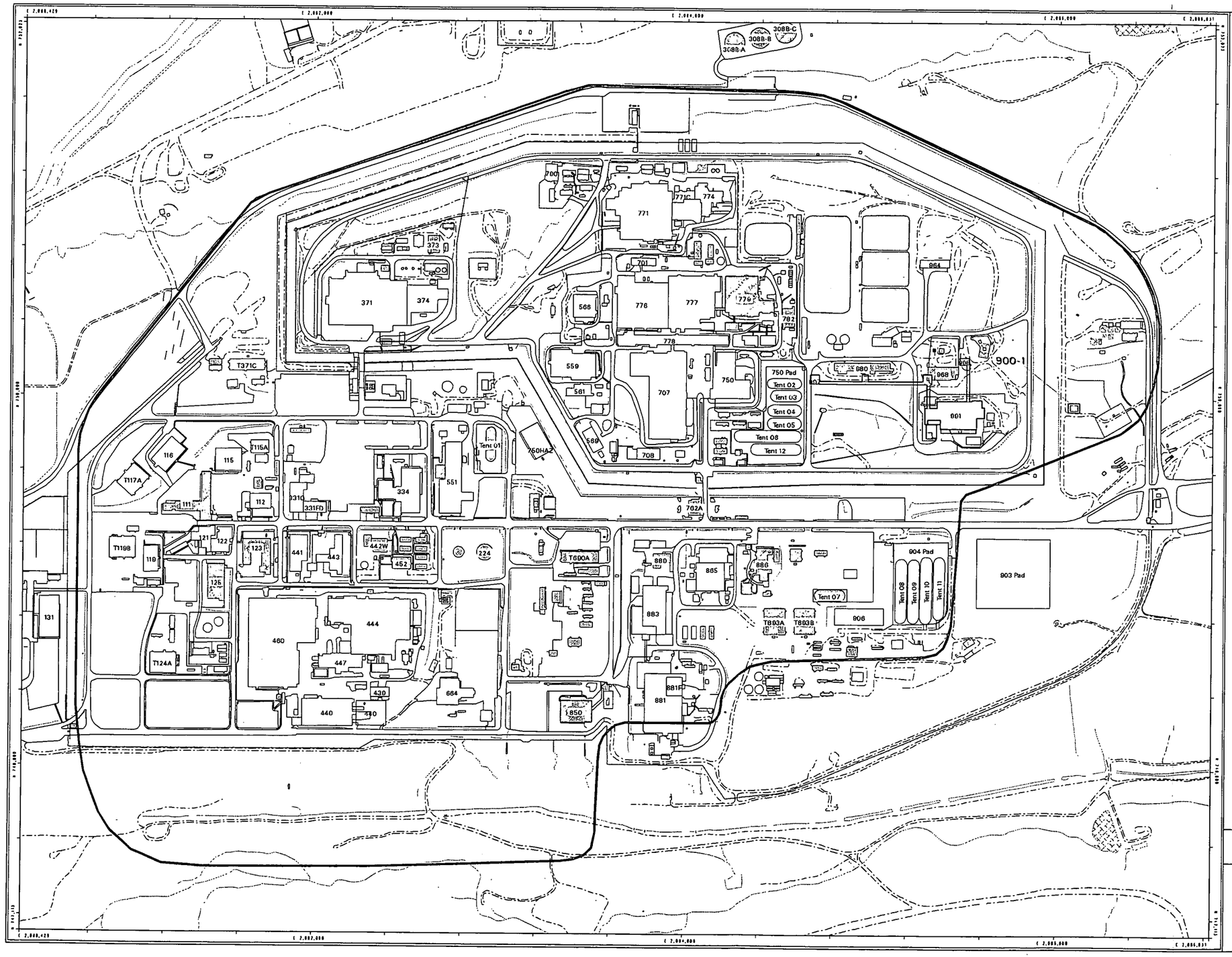

Figure 1
IHSS Group 900-1 Location Map

EXPLANATION

IHSS Group

900-1

Standard Map Features

- Buildings and other structures
- Demolished buildings
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Paved roads
- Dirt roads
- Solar Evaporation Ponds (SEPs)
- Industrial Area Operable Unit Boundary

DATA SOURCE BASE FEATURES:
RMCo
Historical Release Report (HRR)
2nd Annual Update
Sept. 30, 1997
Individual Hazardous Substance Sites (IHSS)
DOE, 1992, HRR Report and Subsequent Updates.
Buildings, fences, hydrography, roads and other structures from 1994 aerial fly-over data captured by EG&G RSL, Las Vegas.
Digitized from the orthophotographs. 1/95

Scale = 1 : 6330
1 inch represents approximately 528 feet

150 0 300 600ft

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

GIS Dept. 303-966-7707

December 03, 2002

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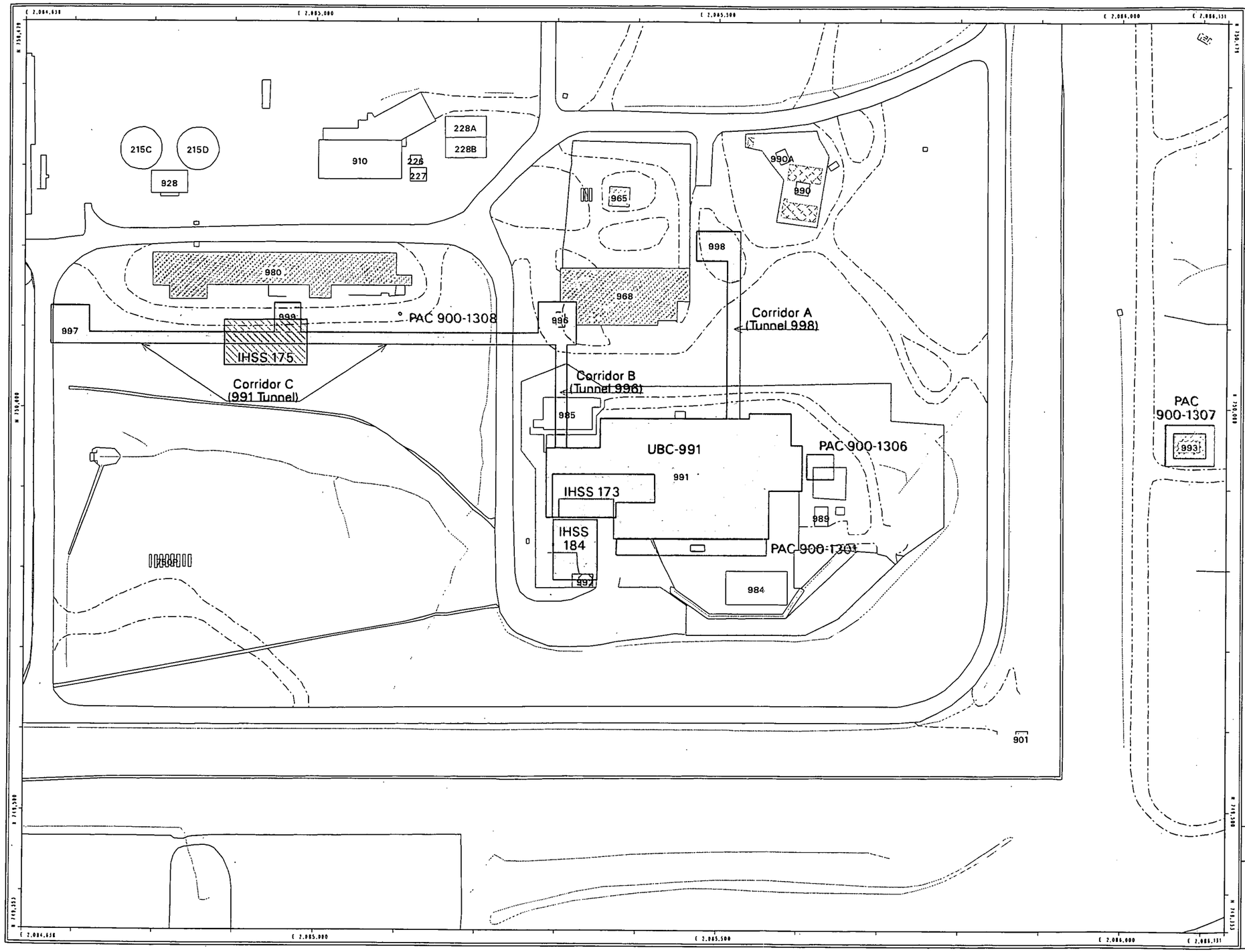

Figure 2

Potential Remediation Areas
IHSS Group 900-1

EXPLANATION

- UBCS for IHSS Group 900-1
- IHSS for IHSS Group 900-1
- PACS for IHSS Group 900-1
- IHSS not in IHSS Group 900-1
- PACS not in IHSS Group 900-1

Standard Map Features

- Buildings and other structures
- Demolished buildings
- Lakes and ponds
- Streams, ditches, or other drainage features
- Fences and other barriers
- Paved roads
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DATA SOURCE BASE FEATURES:
PACs
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Individual Hazardous Substance Sites (IHSS)
DOE, 1992, HRR Report and Subsequent Updates.
Buildings, fences, hydrography, roads and other structures from 1994 aerial fly-over data captured by EG&G RSI, Las Vegas.
Digitized from the orthophotographs. 1/95

N

Scale = 1 : 1450
1 inch represents approximately 121 feet

50 0 100 200ft

State Plane Coordinate Projection
Colorado Central Zone
Datum: NAD27

U.S. Department of Energy
Rocky Flats Environmental Technology Site

GIS Dept. 303-968-7707

December 03, 2002

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